

**Annals**  
of the  
**Missouri Botanical Garden**

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Vol. 28

SEPTEMBER, 1941

No. 3

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A PRELIMINARY SURVEY OF THE  
GENUS *TRIPSACUM*

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When Mangelsdorf and Reeves<sup>1</sup> demonstrated in 1931 that *Zea* could be hybridized with *Tripsacum*, it became evident that a detailed monograph of the latter genus was of practical and theoretical importance. When in 1938<sup>2</sup> they advanced the hypothesis that *Tripsacum* had played an important role in the development of North American maize, such a monograph became a scientific necessity. The available evidence, taxonomic, genetic, and cytological, suggested that the relationships of the various entities in *Tripsacum* were very poorly understood and that they might be quite intricate; extensive field work, cytological examination of living material, and routine taxonomic techniques would all be necessary if an adequate understanding of the genus was to be reached. A comprehensive program was accordingly outlined, and two successive grants from the Penrose Fund of the American Philosophical Society

<sup>1</sup> Journ. Hered. **22**: 329-343.

<sup>2</sup> Proc. Nat. Acad. Sci. **24**: 303-312.

Issued September 20, 1941.

enabled Dr. Cutler to visit the chief eastern herbaria and to collect extensively in the United States, Mexico, and Guatemala in 1940 and 1941. We are also indebted to various other institutions and individuals for coöperation and support in the development of this program. For information, herbarium specimens, living plants, transportation, etc., acknowledgment should be made to G. T. Barrusta, P. C. Mangelsdorf, Mariano Pacheco, Ulises Rojas, H. B. Parks, and numerous others. We are under a very special obligation to J. H. Kempton, who not only supplied us with much pertinent information but even turned over to us his own unpublished notes on the genus.

It is now apparent that our original estimate was correct and that anything like a final judgment on the entities which make up the genus *Tripsacum* must await the collection and integration of evidence from several fields. We are therefore publishing this preliminary survey as a center about which the efforts of those interested in the problem may be coördinated. A collection of living plants is being assembled at the Missouri Botanical Garden, largely for cytological examination. We shall be grateful for plants or viable seeds from known localities or for chromosome counts made on plants of known derivation. We shall also appreciate herbarium specimens from localities other than those cited below. Plants, seeds, or specimens should be sent to Edgar Anderson, Missouri Botanical Garden, St. Louis, Missouri.

*Tripsacum* is unfortunately one of those genera which present special difficulties to the collectors and have consequently been rather neglected by them. Making an accurate and complete record of a *Tripsacum* plant on an ordinary herbarium sheet is like attempting to stable a camel in a dog kennel. By selecting portions of the plant and supplementing the specimen with pertinent information, an acceptable substitute for a complete specimen can be made, however. Where possible, such a record should include: (1) a terminal or lateral inflorescence (labelled as such since the terminal is usually more branched); (2) one or two successive internodes, with the sheaths, auricles, and lower portions of the leaf-blades attached; (3) a

complete leaf from one of the lowermost nodes, labelled as such (though neglected by many collectors this is particularly important since the species differ markedly in the degree to which the blade is constricted above the sheath on the lower leaves); (4) notes as to the height of the plants, number of nodes, and number of lateral inflorescences.

The available cytological evidence suggests that phylogenetic relationships within the genus may be quite complex. We are therefore deliberately postponing final judgment on many of the entities until chromosome counts can be made on a much larger scale and until our field studies are completed. Since we now know that the genus extends to South America it may be a matter of some years before the evidence is assembled. We have accordingly been conservative in proposing any new names, though under each species we have discussed briefly those variants which might ultimately receive recognition. The new species described from South America is advanced to this rank because it has previously been confused with a species to which in our opinion it bears no very close relationship.

Specimens are cited geographically according to states and alphabetically according to collectors under the states. The first time a collector's name appears his initials are given, if they be two or more; if not, the whole name where this is known. The following abbreviations have been used in referring to specimens in the various herbaria:

- Ba—Bailey Hortorum, Cornell University.
- F—Field Museum of Natural History.
- Gray—Gray Herbarium, Harvard University.
- Ha—Museum of Economic Botany, Harvard University.
- MBG—Missouri Botanical Garden.
- Mich—University of Michigan.
- NY—New York Botanical Garden.
- USDA—United States Department of Agriculture.
- USNH—United States National Herbarium.
- Wisc—University of Wisconsin.
- Yale—Yale University.

**Tripsacum** L. Syst. Nat. ed. 10. 1261. 1759.

*Digitaria* Heist. ex Adans., Fam. Pl. 2: 38, 550. 1763.

The genus has been a little-known one, and the variations within the species and the distribution have been left unstudied. A. S. Hitchcock<sup>3</sup> published a synopsis of *Tripsacum* in 1906, and in 1909 G. V. Nash<sup>4</sup> outlined the species for the 'North American Flora.' Since these two works appeared, many specimens have been collected, and although there are not yet enough to provide a firm basis for a complete revision of the genus, there are sufficient to indicate the problems which will be encountered.

1. **T. floridanum** Porter ex Vasey, Contrib. U. S. Nat. Herb. 3: 6. 1892.

*T. dactyloides* var. *floridanum* Beal, Grasses N. Amer. 2: 19. 1896.

This species is apparently distinct, and its delicate habit resembles that of *Manisuris cylindrica* more than that of any *Tripsacum* species.

The Texas collection is probably introduced from Florida as no collections between the points have been made.

FLORIDA: on road and glade at Crossman's, Dade Co., 9 Dec. 1903, *A. A. Eaton 530* (Gray, USNH); rocky soil recently burned, Gorruais, Dade Co., 25 Feb. 1905, *Eaton 1243* (Gray); Miami, June 1877, *A. P. Garber 77* (Gray, USNH TYPE); Miami, March 1903, *A. S. Hitchcock* (USNH); on coral rock, Homestead, 2 April 1906, *Hitchcock 686* (USNH); rocky soil near river, Miami, 4 April 1906, *Hitchcock 726* (USNH); between Florida City and Royal Palm State Park, 30 Oct. 1935, *H. L. Loomis* (MBG, USNH); moist ditch in tropical hammock, 3 miles west of South Miami, 30 Jan. 1933, *Hugh O'Neill 7610* (NY, USNH); Miami, 4-7 April 1898, *C. L. Pollard & G. N. Collins 272* (NY, USNH); pinelands near Nixon-Lewis Hammock, Dade Co., 15 Jan. 1916, *J. K. Small 7350* (Gray, MBG, NY, USNH); in everglades near the unfinished railroad grade between Cocoanut Grove and Cutler, 31 Oct.-4 Nov. 1903, *Small & J. J. Carter 597* (NY); pinelands, Homestead to Big Hammock Prairie, 15-17 Feb. 1911, *Small, Carter, G. K. Small 3433* (NY, USNH); in pinelands near the Homestead Trail, near Camp Longview, 13-16 May 1904, *Small & P. Wilson 1698* (NY); in pinelands, southern peninsular Florida, 6-7 May 1903, *Small & Wilson 1727* (NY); rocky pine forest, open places and along roadsides, Homestead, 15 Feb. 1935, *J. R. Swallen 5225* (USNH); Miami, 8 May 1904, *S. M. Tracy 9318* (Gray, MBG).

<sup>3</sup> Bot. Gaz. 41: 297-298.

<sup>4</sup> N. Am. Fl. 17: 79-81.

TABLE I  
SPECIFIC CHARACTERS IN TRIPSACUM\*

	Distribution	Height in meters	Leaf width in mm.	Shape of blade	Pubescence of sheath	Auricle	Number of branches in terminal inflorescence	Accessory male spikelets
<i>T. floridanum</i>	Florida	0.5-1	1-5	Not petiolate	Glabrous	Very indistinct	1 (2-3)	Sessile (subsessile)
<i>T. dactyloides</i>	Eastern and cen- tral U. S.	1-2	15-30 (40)	Not petiolate	Glabrous (scabrous)	Indistinct	1-2 (3-6)	Sessile (subsessile)
<i>T. australe</i>	S. America	?	10-40	Somewhat petiolate	Lanulose- tomentose within	Distinct to subdistinct	1-4	Sessile
<i>T. lanceolatum</i>	Arizona to Guatemala	0.5-2	10-30	Not petiolate	Sparsely hirsute	Very indistinct	1 (2-5)	Sessile to subsessile
<i>T. fasciculatum</i>	Mexico & Guate- mala, widely cult.	1-3	30-80	Not petiolate	Glabrous	Indistinct	6 (1-12)	Pedicellate (sessile)
<i>T. pilosum</i>	Mexico to Guatemala	2-6	20-100	Not petiolate	Tuberculate- hispid	Distinct	15 (4-22)	Pedicellate (subsessile)
<i>T. latifolium</i>	Cent. Amer., West Indies, northern S. Amer.	1-4	20-80	Lower leaves petiolate	Glabrous (pilose)	Indistinct	2-3	Sessile to pedicellate

\* Parentheses signify variations from the usual condition.

TEXAS: damp sands, Beaumont, 24 April 1903, *J. Reverchon 4188* (Gray, MBG, USNH).

- 2. *T. dactyloides*** (L.) L., Syst. Nat. ed. 10. 1261. 1759.  
*Coix dactyloides* L., Sp. Pl. 972. 1753.  
*C. angulatus* Mill., Gard. Dict. ed. 8. *Coix* no. 2. 1768.  
*Ischaemum glabrum* Walt., Fl. Carol. 249. 1788.  
*T. monostachyum* Willd., Sp. Pl. 4: 202. 1805.  
*T. dactyloides* var. *monostachyon* Eaton & Wright, N. Amer. Bot. ed. 8. 461. 1840.  
*T. compressum* Fournier, Bull. Soc. Roy. Bot. Belg. 15: 466. 1876.  
*T. dactyloides* var.  $\beta$  *monostachyum* Fourn., Mex. Gram. 68. 1886.  
*Dactylodes angulatum* Kuntze, Rev. Gen. Pl. 2: 773. 1891.  
*T. dactyloides* var. *monostachyum* Vasey, Contrib. U. S. Nat. Herb. 3: 6. 1892.  
*Dactylodes Dactylodes* (L.) Kuntze, Rev. Gen. Pl. 3: 349. 1898.

This species is almost as variable as those to the south. There are at least five groups which can be distinguished although only one of these is distinct. (1) The specimens from along the Atlantic coast, which include the type, are less variable than any other group. The spike is usually solitary or binate, the staminate glumes stiff, bluntly tipped and the backs of them almost straight. (2) In Florida and adjacent Alabama and Georgia is found a wide-leaved and robust type with hairs at the ligule and on the inner side of the sheath and leaf adjacent. (3) On the prairies and plains and down to the Gulf coast of Texas and Louisiana is found a very variable form which, unlike all the other groups, with haploid chromosome numbers<sup>5</sup> of 36, has haploid numbers of 18. This group has staminate glumes which are more variable, more pilose and scabrous, and with the back greatly curved. In large colonies of this group it is usually possible to find several plants which have the upper staminate spikelet barely pedicellate. (4) From

<sup>5</sup> Mangelsdorf & Reeves. Texas Agr. Exp. Sta. Bull. 574. 1939.

Central Illinois there are three specimens (the only ones from that area) with sub-pedicellate staminate bracts and with glumes softer and occasionally tapering. More material of this form is particularly desirable.

CONNECTICUT: Guilford, 16 Aug. 1907, *A. I. Bartlett* (Yale); edge of salt marsh, Guilford, 19 Aug. 1906, *G. H. Bartlett* (Gray); Bridgeport, 1832, *H. C. Beardslee* (Yale); salt marsh at Pond Point, Milford, 27 July 1900, *C. H. Bissell 2033* (Yale, Gray); waste ground, Raton Point, Norwalk, 23 Aug. 1901, *Bissell 5389* (Yale); border of salt marsh, Guilford, 14 Aug. 1906 & 3 Sept. 1917, *Bissell* (Yale); in dry field by salt marsh, Stratford, 9 July 1912, *A. E. Blewitt 318* (Yale); Pond Point, Milford, 24 Aug. 1909, *H. S. Clark* (Yale); dry bank of Housatonic River, in colonies along coast, Stratford, 31 July 1893, *E. H. Eames* (Gray, Yale); south end, East Haven, 1882, *D. C. Eaton* (Yale); along shores and coves, East Lyme, Groton and Waterford, 1882–1889, *C. B. Graves* (Yale); brackish meadows, Branford, 3 Sept. 1902, *R. W. Woodward* (Gray, Yale).

NEW YORK: near garbage reduction plant, Staten Island, 16 July 1932, *J. A. Drushel 8309* (MBG).

PENNSYLVANIA: Safe Harbor, 2 Aug. 1882, *Small* (NY).

NEW JERSEY: sandy beach along Delaware River, near Elsinboro Point, 3 miles southwest of Salem, 31 Oct. 1933, *J. M. Fogg, 6280* (Gray); dike bordering tidal marsh, 1.5 miles southwest of Harrisonville, 29 Oct. 1934, *Fogg* (Gray); along stream, Woodbridge, 13 Sept. 1915, *L. H. Lighthipe* (MBG); Cape May, 4 Aug. 1909, *F. W. Pennell 2225* (USNH).

MARYLAND: Great Falls, 4 Sept. 1899, *C. R. Ball 68* (Gray); River View, 9 Aug. 1891, *F. Blanchard* (USNH); dry sandy soil, Salisbury, Sept. 1867, *W. M. Canby 173* (USNH); sandy beach, Millstone, 4 Aug. 1911, *Hitchcock 7886* (USNH); on rocks at Great Falls, 2 Sept. 1898, *T. Holm* (USNH); Mattawoman Creek, 3 Aug. 1914, *I. Tidestrom 7223* (Gray, MBG, USNH).

DELAWARE: near Wilmington, July 1866, *Canby* (Gray, Mich, MBG, Yale); Augustina Beach, 11 Aug. 1911, *J. R. Churchill* (Gray).

VIRGINIA: roadside, Arlington Farm, near Rosslyn, 13 Sept. 1933, *H. A. Allard 58* (Gray); Bedford Co., 15 Aug. 1871, *A. H. Curtiss 9848* (MBG); dry roadside bank, Munden, Princess Anne Co., 1 Aug. 1934, *M. L. Fernald & Bayard Long 3666* (Gray); rich alluvial woods and thickets back of sand beach of James River, Claremont Wharf, Surry Co., 13 June 1938, *Fernald & Long 8097* (Gray); swales, Munden, 3–19 Sept. 1905, *K. K. Mackenzie 1743* (Gray, NY); Portsmouth, 4 July 1897, *E. B. Noyes 3495* (Yale).

NORTH CAROLINA: Chapel Hill, May, *W. W. Ashe* (Yale); open moist low soil along Hitchcock Creek, Rockingham, Richmond Co., 25 Aug. 1936, *D. S. Correll 7124* (Gray); open bank of Lake Raleigh, Wake Co., 20 May 1938, *R. K. Godfrey 4014* (Gray, NY); sandy soil, marsh bordering Brice Creek, 2 miles southwest of James City, Craven Co., 11 July 1922, *L. F. & F. R. Randolph 868* (Gray); Asheville, 19 Aug. 1891, *A. B. Seymour 2* (Gray, MBG); ditch bank, Pullman Park, Raleigh, 27 June 1927, *K. M. Wiegand & W. E. Manning 120* (Gray).

SOUTH CAROLINA: damp soil, near Troy, McCormick Co., 8 May 1921, *John Davis*

2006 (MBG); in moist ditch along roadside, near the Clementia Tourist Camp, 14 miles south of Charleston, 8 Nov. 1929, *H. N. Moldenke 142* (NY); swale, south side of Santee River, north of Bonneau, Berkeley Co., 12 July 1927, *Wiegand & Manning 121* (Gray).

GEORGIA: Yellow River, Gwinnett Co., 27 July 1897, *H. Eggert* (MBG); sandy soil near Middle Oconee River, Clarke Co., alt. 620 ft., 29 June 1900, *R. M. Harper 99* (Gray, NY); field by Bobbin Mill Creek, Athens, 16 June 1934, *L. M. Perry 755* (NY); Yellow River near McGuire's Mill, Gwinnett Co., alt. 750 ft., 2 July 1895, *Small* (NY).

MISSISSIPPI: Grand Batture Island, 23 May 1911, *A. H. Howell 748* (USNH); Long Beach, 19 Aug. 1891, *J. F. Joor*, (MBG); near Starkville, 27 Sept. 1896, *T. H. Kearney 59* (Gray, USNH); Agricultural College, Oktibbeha Co., 11-17 Aug. 1896, *C. L. Pollard 1272* (Gray, MBG, NY, USNH); low ground, Milton, July 1931, *William Rhodes* (Gray); in ditches along roadside, Agricultural College, 17 July 1902, *P. L. Ricker 848* (USNH); Miller, De Soto Co., 12 July 1923, *L. E. Wehmeyer* (Mich).

FLORIDA: near Tallahassee, *N. K. Berg* (NY); hammock south of Miami, 8 Sept. 1907, *Agnes Chase 3903* (USNH); Homosassa, *Robert Combs 943* (Gray); along edge of saw grass and lakes in fertile hammock, not uncommon, Grasmere, Orange Co., 20 Sept. 1898, *Combs & C. F. Baker 1043* (USNH); large open prairies near small stream, uncommon or rare, Bradenton, Manatee Co., 1898, *Combs 1254* (USNH); low moist soil near Osprey, Sarasota Co., 9 July 1936, *Correll 5889* (Gray); open dry soil along edge of ditch, near Oviedo, Seminole Co., 8 Aug. 1936, *Correll 6355* (Gray); low thickets, Duval Co., June, *A. H. Curtiss 3626* (Gray, USNH), *3926* (NY); rich soil near Jacksonville, 13 June 1894, *Curtiss 4951* (NY); low black soil near St. Petersburg, 2 Oct. 1907, *Mrs. C. C. Deam 2827* (Gray); Alapattah, 24 Dec. 1903, *Eaton* (Gray); around pond, Fort Myers, Lee Co., July-Aug. 1900, *Hitchcock 534* (Gray, USNH); moist place by river, Miami, 29 March 1906, *Hitchcock* (USNH); Orange City, edge of marl pit, 28 May 1910, *S. C. Hood* (MBG); Apalachicola, 15 July 1895, *Kearney 105* (MBG); salt marshes, Fort George Island, Duval Co., 9 June 1896, *Lighthipe 462* (NY); 8-12 ft. high, in flatwoods near L. Hancock, growing in clumps of palmetto west of Winter Haven, Polk Co., 6 June 1931, *J. B. McFarlin 5689* (USNH); in dry sandy field, Hollywood, Broward Co., 9 Feb. 1930, *Moldenke 583* (MBG, NY); in everglades, along Tamiami Trail, 25 miles west of Miami, Dade Co., 26 Dec. 1927, *Moldenke 3743* (NY); clay soil, vicinity of Eustis Lake, Lake Co., 1-15 April 1894, *G. V. Nash 374* (Gray, MBG, NY, USNH); edge of a cypress swamp, 4-7 ft. tall, Lake Harris, near Ocklawaha River, 5 July 1895, *Nash 2140* (NY); Lake City, Columbia Co., 11-19 July 1895, *Nash 2207* (Gray, USNH); Little River, 26 March 1923 *D. C. Peattie 1915* (USNH); Lake City, 29 June 1894. *P. H. Rolfs 806* (MBG, USNH); 1842, *F. Rugel 438* (MBG, USNH); hammock, Cutler, 15 Nov. 1906, *Small & Carter* (NY); Ft. Myers, Lee Co., 1 June 1916, *J. P. Standley 215* (Gray, MBG, USNH); moist place among pines and scrub palmetto, Titusville, 29 May-3 June 1926, *Swallen 212* (MBG, USNH); edge of old cultivated field, Marianna, 25-29 June 1926, *Swallen 492* (USNH); Long Key, 25 May 1901, *S. M. Tracy 7775* (Gray, USNH); edge of salt marsh, Ormond, 8 Aug. 1896, *H. J. Webber 472* (USNH).

ALABAMA: Auburn, 12 June 1897, *G. W. Carver 48* (USNH); in a swale, near

Selma, 29 June 1895, *Kearney 10* (Gray, MBG, NY, USNH); low rich places, Mobile, 1 June 1883, *Charles Mohr 603* (USNH); *Alex. Winchell 236* (USNH).

LOUISIANA: U. S. Rice Experiment Station, 1 mile west of Crowley, Acadia Parish, 21 May 1940, *H. C. Cutler 3156* (Ba, F, MBG, NY, Ha, USDA); 1 mile east of Vinton, alt. 60 ft., 3 May 1941, *Cutler 4813* (MBG); in salty swamps, Pointe a la Hache P. O., 4 July 1885, *A. B. Langlois* (USNH); prairie, Welsh, Jefferson Davis Parish, 17 May 1915, *E. J. Palmer 7652* (NY); large clump in swamp, Cameron Co., 11–13 June 1931, *Swallen 1891* (USNH); east bank of lower Bayou Little Caillou, 27 miles below Houma, near Cocodrie, 8 June 1913, *E. C. Wurzlow* (USNH).

MICHIGAN: along railroad tracks, Utica, 11 Aug. 1922, *O. A. Farwell 6297* (Mich, Gray, USNH).

INDIANA: common along a ditch through a cultivated field about 5 miles east of Lincoln City, Spencer Co., 10 Oct. 1931, *C. C. Deam 51560* (USNH).

TENNESSEE: Nashville, *A. Gattinger* (Gray, USNH); along the French Broad River between Paint Rock and Del Rio, Cocke Co., 10 Sept. 1897, *Kearney 938* (NY, USNH); low places, Spring City, July 1929, *Rhodes* (Gray).

ILLINOIS: wet prairies about Salem, July 1860, *M. S. Bebb* (Gray, Yale); Kickapoo Prairie, near Washington, wet ground, June 1835, *George Engelman* (MBG); Spoon River bottom, Fulton Co., 6 June 1842, *O. B. Mean* (USNH); Hancock, 1842, *Mean* (Wisc).

IOWA: infrequent in wet places, Decatur Co., 14 July 1897, *T. J. & M. F. L. Fitzpatrick* (NY).

MISSOURI: uncommon, rocky river banks, Greene Co., 4 Sept. 1892, *B. F. Bush 430* (NY); Montier, 30 June 1894, *Bush 877* (MBG); on Skinker's Wege, St. Louis, 29 June 1875, *Eggert* (MBG); Springfield, 1897, *S. A. Hoover* (Gray); Jerome, 6 June 1914, *J. H. Kellogg* (MBG); St. Clair, Franklin Co., 12 June 1928, *Kellogg 2103* (MBG); Washington, Franklin Co., 25 June 1888, *L. H. Pammel* (MBG); low ground northeast of Springfield, 21 Aug. 1912, *P. C. Standley 9155* (USNH); low woods along Black River,  $\frac{1}{4}$  mile west of Hendrickson, Butler Co., 30 June 1936, *Julian Steyermark 11321* (MBG); sandy alluvium along Eleven Point River,  $1\frac{1}{2}$  mile north of McCormack Hollow, Oregon Co., 27 July 1936, *Steyermark 12322* (MBG); lower wooded slopes bordering field along King's River, southeast of Allen Ford, in Barry Co., 22 June 1937, *Steyermark 22577* (MBG); open limestone slopes along Indian Creek near Holy Cliff,  $3\frac{1}{2}$  miles northeast of Topaz, Douglas Co., 19 July 1937, *Steyermark 23366* (MBG).

ARKANSAS: low wet fields, Monticello, Drew Co., *Delzie Demaree 13690* (NY); wet places, Miller Co., 23 July 1896, *Eggert 155* (USNH); Monticello, 24 July 1881, *G. W. Letterman* (USNH); open field adjacent to station, Stuttgart, 30 July 1932, *D. M. Moore 32805* (NY).

KANSAS: along railroad, 5 miles northwest of Lawrence, Douglas Co., 18 June 1938, *Edgar Anderson* (MBG); Florence, 28–30 July 1903, *David Griffiths 5045* (USNH); sandy roadside, 2 miles west of St. George, Riley Co., 3 June 1908, *Hitchcock 2527* (USNH); 2–3 ft. high, low prairie, Manhattan, 24 June 1913, *Hitchcock 10420* (USNH); wet places, Riley Co., 20 June 1895, *J. B. Norton 580* (Gray); schoolhouse hill & town reservoir, Pleasanton, Linn Co., 19 June 1929, *P. A. Rydberg & Ralph Imler 85* (NY); Big Spring, 3 or 4 miles south of Bilby's Lakes, 16 July 1929, *Rydberg & Imler 1072* (NY); high prairie, Lawrence, Aug. 1892, *W. C. Stevens 62* (USNH).

OKLAHOMA: Cimarron Valley, Cherokee Outlet, 1891, *M. A. Carleton 225* (USNH); in the Indian Terr., chiefly on the False Washita, between Fort Cobb & Fort Arbuckle, 1868, *Ed. Palmer 422* (Yale); grassy valley near Fairvalley, Woods Co., 28 May 1913, *G. W. Stevens 753* (Gray, USNH); in large gravelly bar in Spring River, near Ottawa, Ottawa Co., 29 Aug. 1913, *Stevens 2510* (Gray); grassy sandy valley near Guthrie, Logan Co., 14 June 1914, *Stevens 3284* (Gray).

TEXAS: Leon Springs, Bexar Co., 19 May 1911, *Mr. & Mrs. J. Clemens 21* (MBG, USNH); Soil Conservation Service Nursery, San Antonio, 23 May 1940, *Cutler 3158* (MBG, Ha); Soil Conservation Service Nursery, from seed secured from Bellville, Texas, 23 May 1940, *Cutler 3159, 3160, 3161, 3164, 3165* (MBG, Ha); Parita Creek, Bexar-Wilson Co. line crossing, alt. 700 ft., locality of Mangelsdorf & Reeves "San Antonio" *Tripsacum*, 23 May 1940, *Cutler 3169* (MBG); Kemah, alt. 20 ft., 3 July 1926, *G. L. Fisher 267* (USNH); 6 miles west of Raywood, Liberty Co., alt. 60 ft., 6 May 1941, *Cutler 4815* (MBG); between Ft. Bend and Harris Cos., 11 miles southwest of Houston, alt. 60 ft., 6 May 1941, *Cutler 4816* (MBG); Houston, 11 July 1915, *Fisher 1711* (USNH); wet ground, Houston, 20 April 1872, *Elihu Hall 844* (Gray, NY, USNH); roadside, Waxahachie, 19 May 1936, *H. E. Hazard* (Gray); Harvester, 24 April 1906, *Hitchcock 1198* (USNH); edge of woods near river, New Braunfels, 20 June 1910, *Hitchcock 5240* (USNH); bank of stream, San Antonio, 24 June 1910, *Hitchcock 5255* (USNH); 1888, *G. C. Nealley* (Gray, NY, USNH); rocky creek banks, Austin, Travis Co., 12 May 1918, *E. J. Palmer 13659* (USNH); rich damp lands, Dallas, May 1879, *Reverchon 1156* (USNH); dry sands, Lindale, 15 May 1902, *Reverchon 2804* (NY); Boerne Road at Bexar Co. line, 31 May 1931, *W. A. Silveus 128* (USNH); open places, Brackenridge Park, San Antonio, 4 Oct. 1933, *Sister Mary C. Metz* (NY); in water, Knickerbocker Ranch, Dove Creek, Tom Green Co., May 1880, *Frank Tweedy* (Gray, Yale).

(5) The fifth group is distinct and occupies a separate area on the western edge of the range of the species. All the specimens seen have been from west of the Pecos River. It is probable that there are intergrades but the group is decidedly different from specimens from central and eastern Texas.

**2a. *T. dactyloides* var. *occidentale*, n. var.<sup>6</sup>**

Similar to the species but the staminate glumes more than 9 mm. long, softer, and tapering to an acute tip.

TEXAS: shaded ledges at base of bluff, Little Aguja Canyon, Davis Mts., Jeff Davis Co., alt. 1520 m., 15 June 1931, *J. A. Moore & Julian Steyermark 3092* (Gray, Mich, MBG TYPE, NY, USNH); Chisos Mts., 5 Aug. 1931, *C. H. Mueller 7891* (MBG); rocky partially shaded ground, along streams, near Alpine, Brewster Co., 8 June 1926, *Palmer 30584a* (MBG); rocky banks of creek, in deep canyon, Oak Canyon, Chisos Mts., Brewster Co., 24 May 1928, *Palmer 24159* (Gray, MBG,

<sup>6</sup> *T. dactyloides* var. *occidentale*, var. nov., speciei simile sed glumis stamineis plusquam 9 mm. longis, mollioribus et mucronatis ad apicem.

NY); rocky plains, partially shaded situations amongst syenite boulders, Davis Mts., Jeff Davis Co., 4 Oct. 1926, *E. J. Palmer 31923* (MBG, NY, USNH); Ft. Davis, 1881, *V. Havard* (USNH).

### 3. *Tripsacum australe*, n. sp.<sup>7</sup>

*T. dactyloides* subsp. *hispidum* Hitchcock, Bot. Gaz. **41**: 295. 1906, in part.

Plant slender to robust, nodes usually enlarged; leaves 1–4 cm. wide, somewhat petiolate, blades smooth, usually glabrous, sheath with distinct to semi-distinct auricles, outer surface glabrous below, lanulose-tomentose above, at maturity barely clasping the culm, culm lightly to heavily lanulose-tomentose; inflorescence of 1–4, rarely more, spikes, staminate spikelets sessile.

This species is readily distinguished from *T. dactyloides* by the lanulose tomentum investing portions of the culm and sheath, the tendency of the leaves to become petiolate, and its range. From *T. latifolium* it is distinguished with difficulty in the northern part of its range but the specimens may be determined by the presence of the tomentum, and (on the herbarium specimens, at least) the less petiolate leaves.

The type of tomentum is considerably different from that found in the specimens of *T. lanceolatum* with which the Morong specimen was grouped to form a subspecies of *T. dactyloides*. In the South American plants (*T. australe*) the tomentum is soft and felted while in those of Mexico the hairs are distinct, thicker and harsh.

#### SOUTH AMERICA:

BOLIVIA: among shrubs, Coroico, Nor-Yungas, alt. 1560 m., 25 Dec. 1923, *Hitchcock 22721* (Gray, USNH); marshy edges of forest, Ixiamus, Amazon Basin, alt. 1000 ft., 22 Dec. 1921, *O. E. White 2324* (NY, USNH TYPE).

BRAZIL: *Burchell 9066* (Gray, USNH); in savannas among shrubs, Pará-Marajo Island, Carocara River, June 1914, *Andre Goeldi 87* (USNH); Morrinho do Lyra, Linha Telegr., Matto Grosso, May 1918, *T. G. Kuhlmann 1833* (USNH); *L. Riedel 1279* (Gray, MBG).

<sup>7</sup> *Tripsacum australe*, sp. nov. Planta gracilis vel robusta; nodis plerumque tumidis; foliis 1–4 cm. latis, aliquid petiolatis, laminis levibus plerumque glabris; vaginis cum auriculis plerumque distinctis, superficie exteriori basi glabra, apice lanuloso-tomentosa; culmo lanuloso-tomentoso; inflorescentia plerumque 1–4 spicis, spiculis stamineis sessilibus.

BRITISH GUIANA: Kanuku Mts., behind Parika, Rupunini District, Jan. 1934, *J. G. Meyers 4342* (USNH).

COLOMBIA: coarse herb, up to 6 ft., open hillside, Dept. Santander, upper Rio Lebrija valley, northwest of Bucaramanga, alt. 400-700 m., Eastern Cordillera, 29 Dec. 1926, *E. P. Killip & A. C. Smith 16279* (Gray, NY, USNH); 1760-1808, *J. C. Mutis 5489* (USNH); 5-6 feet tall, local and rather rare on hillsides in sheltered places, generally on the border of forest below 2500 ft., near Masinga, Santa Marta, alt. 400 ft., 27 Oct. 1898, *H. H. Smith 2745 (= 119)* (Gray, MBG, NY, USNH).

ECUADOR: partly shaded slope, large bunches, 4-6 ft., between Huigra and Naranjapata, Prov. Chimborazo, alt. 600-1200 m., 17 July 1923, *Hitchcock 20643* (Gray, NY, USNH).

PARAGUAY: Cerro de Tobatí, 14 Jan. 1903, *K. Fiebrig 746* (Gray); Uferwaldrand feucht, bei Gestein, zwischen Rio Apa und Rio Aquidaban, 1908-1909, *Fiebrig 4613* (Gray); in regione versus superioris fluminis Apa, 1901-2, *E. Hassler 7901* (Gray); in altaplanitie et declivibus, Sierra de Amambay, Dec. 1907, *Hassler 9953* (USNH); Central Paraguay, 1888-1890, *Thomas Morong 675* (MBG, NY, USNH); on the Paraná, 26°-24° S. lat., April 1883, *D. Parodi 53* (NY).

VENEZUELA: on slopes, forms large tufts, ascent from Motatan Bridge to Carvajal, near Valera, Trujillo, *H. Pittier 10768* (Gray, NY, USNH); near Escuque, Trujilla, in savannas on road to Valera, 11 Jan. 1929, *Pittier 13151* (USNH).

**4. *Tripsacum lanceolatum* Rupr. ex Fourn., Mex. Gram. 68. 1886.**

*T. lanceolatum* Rupr. in Benth., Pl. Hartweg. 347. 1857, *nomen nudum*.

*T. acutiflorum* Fourn., Bull. Soc. Roy. Bot. Belg. 15: 466. 1876, *nomen nudum*.

*T. Lemmoni* Vasey, Contrib. U. S. Nat. Herb. 3: 6. 1892.

*T. dactyloides* var. *Lemmoni* (Vasey) Beal, Grasses N. Amer. 2: 19. 1896.

*T. dactyloides* var. *angustifolium* Scribn. in Urbina, Cat. Pl. Mex. 376. 1897.

*T. dactyloides* subsp. *hispidum* Hitchc., Bot. Gaz. 41: 295. 1906, in part.

While Nash<sup>8</sup> (1909) accepted the description by Fournier in 1876 as constituting valid publication, no real distinctions between species were made in Fournier's article and it therefore cannot be accepted. Fournier's later description is based on specimens and is detailed enough to distinguish between the species then known.

<sup>8</sup> N. Am. Fl. 17: 81.

It is possible to separate the specimens of *T. lanceolatum* into three general groups but these have some intergrades, and until further collections are made and more entire plant specimens observed, it will be futile to attempt to delimit these groups.

The type specimen is from Aguas Calientes in Central Mexico, and the group from the central plateau is characterized by a large amount of anthocyanin coloring, narrow leaves, and solitary or paired spikes in the inflorescence. Closest to this group are those specimens found on the west slopes of Mexico, which have broader leaves, solitary to ternate inflorescence spikes, and are the most robust.

From these two groups it is easy to separate those specimens from southern Arizona which formerly went under the name of *T. Lemmoni*. These are characterized by an inflorescence lacking anthocyanin and much divided, with as many as nine spikes, usually pedicellate upper spikelet, and narrow leaves. With present material, this group may be readily separated by the gap between its representatives and those of the other groups. The gap must not, however, be interpreted as a real absence of the plant but as an absence of collections from northern Mexico.

*T. Lemmoni* is probably distinct enough to be considered a good species, but until the extent of the variations within the species *T. lanceolatum* has been determined and until collections have been made at more points in northern Mexico it will be better to consider *T. lanceolatum* as a variable species with *T. Lemmoni* as one of several groups within it.

There are several specimens, as that of Brandegee from El Taste, Baja California, 1 Nov. 1902, which do not fit well into any of the three groups but are well within the species as interpreted herein. There is some resemblance to *T. dactyloides* in the northeastern Mexican specimens, for example, in *Wynd & Mueller 536*, with larger glumes and wider leaves.

ARIZONA:  $\frac{1}{2}$  mile north up lateral canyon, 8 miles down Sonoita Creek from Patagonia, Santa Cruz Co., 28 April 1941, *H. C. Cutler & J. D. Freeman* (MBG); Mule Mts., about 5000 ft., 20 Sept. 1929, *G. J. Harrison & T. H. Kearney 6101*

(Gray, USNH); grown in Washington, D. C. greenhouse by J. H. Kempton, from seeds secured in southern Arizona, probably the Mule Mts., by *Kearney*. U.S.D.A. No. T29-29, picked Oct. 1934 (MBG, USNH); on a high peak with southern slope, near moist rocks, Huachuca Mts., 21 Sept. 1882, *J. G. Lemmon 2932* (Gray, USNH type of *T. Lemmoni*); near Patagonia, 23 Feb. 1930, *H. F. Loomis 6409* (USDA, USNH).

## MEXICO:

AGUAS CALIENTES: Aguas Calientes, 1839, *Theodor Hartweg 252* (NY cotype, complete specimen, USNH, fragments from the Steudel and the Trinius herbaria, cotypes, and Boissier Herb. TYPE).

BAJA CALIFORNIA: El Taste, 13 Sept. 1893, *T. S. Brandegee 4* (NY); Sierra de San Francisquito, 29 Sept. 1899, *Brandegee 6* (USNH); El Taste, 1 Nov. 1902, *Brandegee* (USNH).

CHIHUAHUA: infrequently scattered, occurring as small groups, 2 or 3 m. high, pine oak country; Sierra Canelo, Rio Mayo, 29 Aug. 1936, *H. S. Gentry 2496* (Gray, MBG); in large clumps in arroyo bed by running water, Sierra Charuco, Rio Mayo, 1 Oct. 1936, *Gentry 2914* (Gray); rocky ravine, 8000 ft., Sanchez, 12 Oct. 1910, *Hitchcock 7702* (USNH); Rio Bonito "hot country," 25 Aug. 1936, *Harde Le Sueur Mex-093* (USNH).

COAHUILA: moist stream side, Hacienda Piedra Blanca, Canyon de Sentenela, Sierra del Carmen, Villa Acuña, 6 July 1936, *F. L. Wynd & C. H. Mueller 536* (Gray, MBG, NY, USNH).

COLIMA: large bunches on rocky cliff by seashore, Manzanillo, 20 Sept. 1910, *Hitchcock, Amer. Gr. Nat. Herb. No. 230* (Gray, MBG, NY, USNH); rocky hillside, alt. 1500 ft., Alzada, 21 Sept. 1910, *Hitchcock 7082* (Mich, NY, USNH), *7083* (USNH).

DURANGO: rocky hill, Iron Mt., Durango, alt. 6200 ft., 6-8 Oct. 1910, *Hitchcock 7630* (USNH), *7648* (NY, USNH); La Bajada, Tamazula, 300-600 m., Nov. 1921, *J. G. Ortega 4334* (USNH); city of Durango and vicinity, April-Nov. 1896, *Ed. Palmer 537* (Gray, MBG, NY, USNH).

GUERRERO: 33 km. south of Chilpancingo on Mexico-Acapulco road, alt. 1360 m., 24 Sept. 1940, *Cutler 3918* (Ba, Ha, F, MBG, USDA); on rocks of cliff, alt. 1500 ft., Balsas, 9 Sept. 1910, *Hitchcock 9816* (USNH).

JALISCO: Arenal, 9 Oct. 1923, *Collins & Kempton 79* (USNH); Barranca de Oblatos, Guadalajara, 12 Oct. 1923, *Collins & Kempton 81, 85, 88* (USNH); 0.5 km. north of Tonilita, alt. 700 m., 9 Oct. 1940, *Cutler 4011* (MBG, Ha), *4017* (MBG), *4018* (Ba, Ha, F, MBG, USDA); Platanar, on railroad 53 km. north of Colima, alt. 1000 m., 10 Oct. 1940, *Cutler 4087* (MBG, Ha); walls of barranca, 1 km. north-east of Ciudad Guzman (Zapotlan), alt. 1520 m., 10 Oct. 1940, *Cutler 4088* (MBG), along creek, same locality and date, *4104* (MBG), alt. 1600 m., *4105* (Ba, F, Ha, MBG, NY, USDA); side of Barranca de Oblatos, Guadalajara, alt. 5000-6000 ft., 27-28 Sept. 1910, *Hitchcock 7358* (USNH); La Barranca, Guadalajara, 21 Nov. 1930, *M. E. Jones 27628* (MBG, NY, USNH); Barranca de Oblatos, Guadalajara, 15 Oct. 1921, *Kempton & Collins* (USNH Nos. 1064495-1064497); Hacienda San Diego, Cocula, 21 Oct. 1921, *Kempton & Collins* (USNH); mts. near Guadalajara, 16 Dec. 1889, *Pringle 2610* (USNH); road between Juejuquilla & Mesquitec, 25 Aug. 1897, *Rose 3570* (Gray, USNH).

MEXICO (including DISTRITO FEDERAL): Barranca de Dolores, Lomas de Chapultepec, Aug. 1940, *G. T. Barrusta* (MBG); pedregal near Mexico, 26 June, *M. Bourgeau 444* (Gray); Tlalpam, alt. 7480 ft., 3 Aug. 1924, *Fisher* (MBG); San Angel, alt. 7350 ft., 2 Aug. 1926, *Fisher 53* (USNH); Temascaltepec, alt. 1750 m., 30 Aug. 1932, *G. B. Hinton 1444* (Gray); hill, Tejupilco, 1340 m., Temascaltepec, 4 Sept. 1932, *Hinton 1600* (Gray); copse, edge of field, Tacubaya, 27–30 July 1910, *Hitchcock 5909* (USNH); Mexico City, Oct. 1896, *E. W. D. Holway 8* (USNH); Pedregal de San Angel, Sept. 1927, *E. Lyonnet 61* (Gray, MBG, NY, USNH); rare on volcanic soils, pedregal, Tlalpam, alt. 2300 m., 30 Oct. 1928, *M. St. Pierre 828* (USNH); Tacubaya, *J. G. Schaffner 41* (USNH, fragment from Paris Herb.).

MICHOACAN: near Cerro de las Nalgas, alt. 1900 m., vicinity of Morelia, 9 Sept. 1909, *Bro. G. Arsène 2572* (USNH); Cerro de las Nalgas, alt. 800 m., 9 Sept. 1909, *Arsène* (USNH); near La Huerta, 1950 m., vicinity of Morelia, 1 Sept. 1910, *Arsène 5576* (MBG, NY, USNH); cascade near Loma de La Huerta, alt. 1950 m., vicinity of Morelia, 1 Sept. 1910, *Arsène 7006* (USNH).

MORELOS: small clumps, rocky cliffs, alt. 4500 ft., Cuernavaca, 10–11 Sept. 1910, *Hitchcock 6840* (Mich, USNH); Valle de Tepeite, 16 Sept. 1938, *Lyonnet 2421* (USNH); Teposteco, 22 Sept. 1938, *Lyonnet 2552* (USNH); Xochitepec, 24 Sept. 1938, *Lyonnet 2645* (USNH); Barranca de San Anton, near Cuernavaca, 28 Oct. 1904, *Seler 4348* (USNH).

NAYARIT: Los Fresnos, Tepic, 2 Oct. 1923, *Collins & Kempton T35* (USNH); Cerro del Cruz, Tepic, 1 Oct. 1923, *Kempton & Collins T17* (USNH).

NUEVO LEON: Diente Canyon, Sierra Madre, Monterrey, 29 July 1933, *C. H. & M. T. Mueller 368* (Gray, USNH); in moist places, dense woods bordering stream, Canyon Marisio Abajo, Rancho Las Adjuntas, Municipio de Villa Santiago, 27 June 1935, *Mueller 2069* (Mich, Gray, USNH).

OAXACA: rocky cliff, Oaxaca, 5000 ft., 12–13 Aug. 1910, *Hitchcock 6160* (USNH); Villa Alta, Aug. 1842, *F. M. Liebmann 547* (USNH).

PUEBLA: source au dessus de la finca Guadalupe, alt. 2121 m., 20 Nov. 1906, *Arsène 73* (USNH); Mayorazgo, sur l'Atoyac, alt. 2120 m., vic. Puebla, 7 July 1907, *Arsène 1328* (MBG, USNH); near Hacienda Batan, Barranca de la Alseseca, alt. 2120 m., vicinity of Puebla, 13 June 1907, *Arsène 1472* (MBG, USNH); entre les haciendas Santa Barbara y Cristo, sur l'Alseseca, alt. 2150 m., vic. Puebla, 27 June 1907, *Arsène* (MBG, USNH); Acatzincó, Distrito de Tepeaca, vic. Puebla, alt. 2110 m., July 1907, *Arsène 2266* (MBG, USNH); Mayorazgo, alt. 2120 m., vic. Puebla, 4 July 1907, *Arsène 10106* (USNH); El Riego, July 1905, *C. A. Purpus 1227* (MBG).

SAN LUIS POTOSI: limestone ridges, San Jose Pass, 15 Aug. 1890, *Pringle 3447* (USNH); rocky hills, Las Canoas, 14 Aug. 1891, *Pringle 3811* (Gray, MBG, NY, USNH TYPE of *T. dactyloides* subsp. *hispidum*); Bargre, Aug. 1911, *C. A. Purpus 5433* (USNH).

SONORA: small infrequent colonies, 2–3 m. high, oak hill slope, Quirocoba, Rio Fuerte, 22 Oct. 1936, *Gentry 2953* (USNH); Guadalupe Canyon, 27 Aug. 1893, *E. C. Merron 2035* (USNH); Santa Rosa Canyon, near Bavispe, northeast Sonora, 19 July 1938, *S. S. White 601* (Gray); small valley in granitic hills, 14 miles north of Babiadora on road to Cumpas, 22 Sept. 1934, *I. L. Wiggins 7392* (Mich, USNH).

TAMAULIPAS: Sierra de San Carlos, vicinity of San Jose, alt. 3040 ft., 13 July 1930, *H. H. Bartlett 10310* (NY, USNH).

YUCATAN: edge of old field, Chichen Itza, 7-13 July 1932, *Swallen 2482* (USNH).

GUATEMALA: Lake Retana, north of Jutiapa, 18 Oct. 1935, *Kempton & Wilson Popenoe* (MBG, USNH); San Pedro, alt. 5600 ft., 28 Oct. 1935, *Kempton & Popenoe* (MBG, USNH); below San Pedro, alt. 4600 ft., 29 Oct. 1935, *Kempton & Popenoe* (MBG, USNH); hills above San Lucas, 4500 ft., 9 Nov. 1935, *Kempton & Popenoe* (MBG, USNH).

5. *Tripsacum fasciculatum* Trin. ex Ascherson, Verh. bot. Ver. Prov. Brandenb. **17**: 79. 1875.

*T. fasciculatum* Trin. ex Steud., Nomencl. Bot. **2**: 712. 1841, *nomen nudum*; Gram. **1**: 363. 1855, *nomen nudum*; ex Rupr., Bull. Acad. Roy. Brux. **9**: 243. 1842, *nomen nudum*.

*T. laxum* Nash, N. Amer. Fl. **17**: 81. 1909.

This species has a rather wide range of variation but is easily distinguished in most cases by the smooth sheaths, the wide and not petiolate leaves, and the robust habit.

Specimens from cultivation vary considerably, and this may be due to a more favorable environment. In central Guatemala *T. fasciculatum* is cut for forage, probably from native stands. This species apparently has a high degree of sterility. Herbarium specimens of it or of *T. pilosum* never reveal the shiny seeds which in *T. dactyloides* are indicative of a well-developed endosperm. Nearly a thousand seeds were collected in Mexico and Guatemala but all those examined had undeveloped embryos, and when planted have so far failed to germinate. The amount of variation in time of flowering and size and number of parts of large colonies in both Mexico and Guatemala, however, suggest that the members of a colony are not all of the same clone.

In northern Guatemala and in western Mexico no intergrades have been found between *T. pilosum* and *T. fasciculatum*, although both of these occur in the region. They have never been reported from the same spot but their habitat requirements are similar.

Specimens with solitary terminal spikes are infrequent, and although such plants usually have narrower leaves than those with a much branched inflorescence, the leaves are still wider than those of *T. lanceolatum* and the plant more robust.

## MEXICO:

COLIMA: rocky, grassy hillside, 1500 ft., Alzada, 21 Sept. 1910, *Hitchcock 7103* (Mich).

GUERRERO: 36 km. south of Chilpancingo, alt. 1360 m., 24 Sept. 1940, *Cutler 3915-3917, 3921* (Ba, F, Ha, MBG).

VERA CRUZ: Mirador, Aug. 1841, *Liebmann 549* (MBG, USNH); [Fortin], Zacapan, 1917, *Purpus 8027* (Gray, MBG, NY, USNH); Hacienda de la Laguna, Barrio de Tixedo, 1836, *C. T. Schiede 947* (TYPE, not seen).

GUATEMALA: Jardin de Don Mariano Pacheco, plants from Coban, Alta Verapaz, 8 Nov. 1941, *Cutler 4301* (Ha, MBG); field at 19.5 km. on Guatemala-Barberena road, alt. 6500 ft., 9 Nov. 1940, *Cutler 4306* (Ba, F, Ha, Mich, MBG, NY, USDA, USNH); same locality, 17 Nov. 1940, *Cutler 4324* (MBG); below San Pedro, alt. 4600 ft., 29 Oct. 1935, *Kempton & Popenoe* (MBG, USNH); *J. J. Rodriguez*, received 21 June 1916, grown in quarantine house, U. S. D. A. No. 42967 (USNH); edge of pine forest, Quirigua, Dept. Izabal, alt. 75-225 m., 15-31 May 1922, *Standley 24256* (USNH).

SALVADOR: San Salvador, 1922, *Salvador Calderón 1332* (Gray, NY, MBG, USNH); seed from *C. Deusen*, grown in greenhouse, Washington, D.C., 14 March 1924 (USNH); cultivated as forage, 21 Nov. 1916, *Carlos Renson 1, 2* (USNH); cultivated, vicinity of San Salvador, 650-850 m., 30 March-24 April 1922, *Standley 22631, 23637* (Gray, MBG, USNH).

PANAMA: cultivated for forage, Coclé, alt. 600 m., *Paul Allen 2252* (MBG).

**6. *T. pilosum*** Scrib. & Merr., U. S. Dept. Agric. Div. Agrost. Bull. 24: 6. 1901.

We have never seen this species or *T. fasciculatum* growing without having found *T. lanceolatum* near by. *T. pilosum* is more selective in its habitat, and in localities on the west slope of Mexico it will be found in more protected sites while *T. lanceolatum* will extend beyond the margins of the best localities. Thus, *T. pilosum* is usually restricted to damp spots in open woods, along the railroads and on the slopes of deep canyons, but *T. lanceolatum* will grow in these places and in addition will fringe the upper rim of the canyon and encroach upon the dry plains and hillsides.

There is a local distinction between these two species. *T. pilosum* is known as *maiscillo*, *T. lanceolatum* as *sacaton*, a general term for coarse grasses. The irritating hairs of *T. pilosum* have been noted by Kempton (MS.), and we found that the hand which grasped the basal sheaths of this species during a day of collecting would remain swollen and sore for several days.

This species differs from *T. lanceolatum* in its more robust growth habit, the densely tuberculate-hispid leaf sheaths, and the large numbers of spikes in the inflorescence. From *T. fasciculatum* it differs mainly in the hispid character of the leaf sheaths but the pedicels of *T. fasciculatum* are, in addition, usually shorter and thicker, the number of spikes smaller, and the plant less robust.

MEXICO:

COLIMA: open grassy ground among rocks, steep slope of ravine, Alzada, 21 Sept. 1910, *Hitchcock 7088*, or *Amer. Gr. Nat. Herb. No. 231* (Gray, MBG, NY, USNH).

DURANGO: Sierra Madre, alt. 5200 ft., 15 Aug. 1897, *J. N. Rose 3513* (USNH).

GUANAJUATO: garden of college, Guanajuato, 1901, *Alfredo Dugès* (Gray).

JALISCO: frequent widely separated clumps, 3.7 m. high, 0.5 & 5.0 km. north of Tonilita, alt. 1000 m., 9 Oct. 1940, *H. C. Cutler 4013* (MBG) & *4019* (Ba, F, Ha, MBG, USDA); frequent on walls of barranca 1 km. northeast of Ciudad Guzman (Zapotlan), alt. 1520 m., 19 Oct. 1940, *Cutler 4079, 4080, 4081, 4082* (MBG); same data, *4089* (Ha, MBG); same locality, 22 Oct. 1940, *Cutler 4090* (Ha, MBG); same data, *4091, 4092* (MBG); 3 m. tall, frequent along creek, northeast edge of Ciudad Guzman, alt. 1520 m., 22 Oct. 1940, *Cutler 4110* (Ha, MBG), *4111* (Ba, Ha, MGB, USDA); inflorescence collections from single clones 1 km. northeast of Ciudad Guzman, 22 Oct. 1940, *Cutler 4117, 4118* (MBG); side of Barranca Oblato, Guadalajara, alt. 5000–6000 ft., 27–28 Sept. 1910, *Hitchcock 7343, 7361, 7366* (USNH); La Barranca, Guadalajara, 19 Nov. 1930, *M. E. Jones 27629* (MBG); Barranca de Oblatos, Guadalajara, 15 Oct. 1921, *J. H. Kempton & G. N. Collins* (USNH Nos. 1064498, 1064499, 1064500, 1064503); garden, Etzatlan, 22 Oct. 1921, *Kempton & Collins* (USNH); Etzatlan, 23 Oct. 1921, *Kempton & Collins* (USNH); Los Teosintes, Ampaso, 23 Oct. 1921, *Kempton & Collins* (USNH); Ciudad Guzman, 27 Oct. 1921, *Kempton & Collins* (USNH); Arupara, 23 Oct. 1921, *Kempton & Collins* (USNH); Rio Blanco, June–Sept. 1886, *Ed. Palmer* (Gray, NY, Yale, USNH); hills near Guadalajara, 29 June 1889, *Pringle 2611* (USNH); canyons near Guadalajara, 3 Dec. 1889, *Pringle 2623* (USNH); road between Coatlan and Bolaños, 7–9 Sept. 1897, *Rose 2841* (Gray, USNH TYPE); *Rose & Robert Hay 6278* (USNH).

MICHOACAN: Cerro San Miguel, near Morelia, 10 Feb. 1912, *Arsène 9938* (USNH).

NAYARIT: Los Fresnos, Tepic, 2 Oct. 1923, *Collins & Kempton T34* (USNH); Jala, near Ahuacatlan, 7 Oct. 1923, *Collins & Kempton 80* (USNH); Cerro del Cruz, Tepic, 1 Oct. 1923, *Kempton & Collins* (USNH Nos. 1646091–1646093, 1646115–1646118).

OAXACA: Cerro San Felipe, alt. 1800 m., Distrito del Centro, 12 Aug. 1906, *C. Conzatti 1615* (USNH); Las Sedas, Distrito de Etla, alt. 2000 m., 29 Aug. 1909, *Conzatti 2523* (USNH); Cañada San Juan, Zimatlan, alt. 1925 m., 2 Oct. 1931, *Conzatti 4638* (Mich).

SAN LUIS POTOSI: limestone ledges, Tinanul, 24 July 1891, *Pringle 3993* (USNH); hills, Las Palmas, 24 July 1891, *Pringle 3993* (USNH).

GUATEMALA: Kalkberge, Quien Santo, Huehuetenango, 23 Aug. 1896, *E. Seler 2723* (Gray, USNH).

**7. *Tripsacum latifolium* Hitchc., Bot. Gaz. 41: 294. 1906.**

It is only with difficulty that some of the herbarium specimens of this species may be distinguished. The petiolate character of the large lower leaves seems to be distinctive in this species, but most collectors take only the upper portions of the plant with leaves small enough to put on a herbarium sheet. The rarely collected complete plant series, as *Bartlett 11888*, serve to connect the extremes of the species found in the West Indies, as *Ekman 16226*, and the terminal collections with the type.

West Indian plants are very slender, small, with solitary terminal inflorescences, usually deeply colored with purple. They must, however, be considered as a variant of the species not worthy of distinction at this time.

BRITISH HONDURAS: 10 feet tall, edge of ravine, Mountain Pine Ridge, El Cayo District, 1 March 1931, *H. H. Bartlett 11888* (Mich, NY); near river bank, El Cayo District, Vaca, 4 March 1938, *P. H. Gentle 2298* (USNH).

GUATEMALA: 18 ft. high, near Secanquim, trail to Cahabon, 25 Nov. 1904, *G. P. Goll 44* (USNH); Sierra del Mico, between Los Amates & Izabal, alt. about 750 ft., 23 Feb. 1907, *W. A. Kellerman 6242* (USNH); between San Marcos and San Andreas, alt. 4500 ft., 2 Nov. 1935, *Kempton & Popenoe* (MBG, USNH); La Libertad, Petén District, 18 April 1933, *C. L. Lundell 2836* (Mich); vic. Secanquim, Alta Verapaz, alt. 550 m., 6 May 1905, *H. Pittier 261* (USNH); Cubilquitz, Dept. Alta Verapaz, alt. 350 m., Jan. 1902, *H. von Tuerckheim 8333* (USNH TYPE); 12–15 ft. tall, rich upland soil, hillside north of Quirigua, 2 March 1932, *Weatherwax 90 (1703)* (USNH).

HONDURAS: Tela, 14 Feb. 1931, *Collins & Kempton* (USNH); plants 6–15 ft. high, forming dense colonies, in open swamp, Uluita Station, 24 Jan. 1928, *Standley 54941* (USNH); San Pedro Sula, Dept. Santa Barbara, alt. 1600 ft., 1887, *Carl Thieme 5595b* (USNH); rich soil along river, 6 km. west of Siguatepeque, 1200 m. alt., *T. G. Yuncker, R. F. Dawson, H. R. Youse, 6391* (Mich, MBG, USNH).

PANAMA: cultivated, 1931, *Armour Expedition* (MBG, USNH).

WEST INDIES:

HAITI: open slopes, vicinity of Mission, Fonds Varettes, alt. about 1000 m. and above, 17 April–4 May 1920, *E. C. Leonard 3945* (Gray, USNH); dry ravine northeast of West Indies Co. Plantation, vicinity of St. Michel de l'Atalye, Dept. du Nord, 350 m., 18 Nov. 1925, *Leonard 7157* (USNH).

SANTO DOMINGO: Cordillera Septentrional, Prov. Santiago, Santiago, Cuesta de Piedras, alt. 200 m., 23 Nov. 1930, *E. L. Ekman 16229* (USNH); vast colonies, steep slope near the top, R. D. Cordillera Central, Prov. Santo Domingo, Villa Altigracia, Loma Marian Chicle, 800 m., 6 Jan. 1930, *Ekman 14253* (USNH); prope La Salinas in via do Los Cerarcos, 700 m. alt., Prov. Barahona, Sept. 1911, *Padre Miguel Fuertes 1424* (NY).

TRINIDAD: La Brea, 9 March 1915, *W. E. Broadway 4982* (USNH).

## EXCLUDED SPECIES

The taxonomy of *Rottboellia* and *Manisuris* is in such confusion that, for the most part, we have not been able to go beyond the 'Index Kewensis'.

Mistakes in copying generic names (Index Kew. Suppl. 2: 187. 1904; and Kunth, Enum. Pl: 1: 467, 602. 1833), mistakes in identification (Schlecht. & Cham., Linnaea 6: 40. 1831), adoption and listing of herbarium label names (Urbina, Cat. Pl. Mex. 376. 1897), and other errors have introduced names which must be included in this list of excluded species or under synonymy. It is unfortunate that many of these mistakes were published in the 'Index Kewensis.'

*Tripsacum aegilopoides* Kunth, Enum. Pl. 1: 467, 602. 1833  
= **Rottboellia hirsuta** Vahl, Symb. Bot. 1: 11. 1790.

*T. aristatum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Ischaemum aristatum** L. Sp. Pl. 1049. 1753.

*T. avenacea* Scribn. & Merr. (U. S. Dept. Agric. Div. Agrost. Bull. 24: 23. 1901) acc. to Index Kew. Suppl. 2: 187. 1904  
= **Tristachya avenacea**.

*T. ciliare* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Elionurus tripsacoides** HBK. Nov. Gen. et Sp. 1: 192. t. 62. 1816.

*T. compressum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Hemarthria compressa** R. Br., Prodr. 207. 1810.

*T. cylindricum* Michx., Fl. Bor. Amer. 1: 60. 1803 = **Manisuris cylindrica** Kuntze, Rev. Gen. Pl. 2: 779. 1891.

*T. distachyum* Poir., Encyc. 8: 114. 1808 = **Ischaemum rugosum** Salisb., Ic. Stirp. Rar. 1: t. 1. 1791.

*T. distichum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Ischaemum rugosum** Salisb., Ic. Stirp. Rar. 1: t. 1. 1791.

*T. fasciculatum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Chloris radiata** Sw., Prod. Veg. Ind. Occ. 26. 1788.

*T. giganteum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Anthistiria gigantea** Cav., Ic. 5: 35. 1799.

*T. granulare* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Hackelochloa granularis** Kuntze, Rev. Gen. Pl. 2: 776. 1891.

*T. hermaphroditum* L. Syst. Nat. ed. 10. 1261. 1759 = **Anthephora hermaphrodita** Kuntze, Rev. Gen. Pl. 2: 759. 1891.

- T. hirsutum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Rottboellia hirsuta** Vahl, Symb. Bot. 1: 11. 1790.
- T. laxa* Scribn. & Merr. (U. S. Dept. Agric. Div. Agrost. Bull. 24: 23. 1901) acc. to Index Kew. Suppl. 2: 187. 1904 = **Tristachya laxa**.
- T. mucronatum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Trachys mucronata** Pers. Syn. 1: 85. 1805.
- T. muticum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Ischaemum muticum** L. Sp. Pl. 1049. 1753.
- T. myuros* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Rottboellia Myurus** Benth., Journ. Linn. Soc. 19: 68. 1881.
- T. paniceum* Rasp., Ann. Sci. Nat. I, 5: 306. 1825 = **Pogonatherum saccharoideum** Beauv., Agrost. 176. t. 11. f. 7. 1812.
- T. pubescens* Lichenst. ex Nees, Fl. Afr. Austr. 1: 74. 1841 = **Anthephora pubescens** Nees, Fl. Afr. Austr. 1: 74. 1841.
- T. pubescens* Willd. ex Steud., Nom. Bot. ed. 2, 1: 317. 1841 = **Cenchrus pubescens** Steud., Nom. Bot. ed. 2, 1: 317. 1841.
- T. semiteres* Wallich, Cat. no. 8628. 1828 = **Polytoca semiteres** Benth. in Benth. & Hook. f., Gen. Pl. 3: 1113. 1883.